Abstract No. seem558

X-ray diffraction of designed 3–D DNA lattices

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Beamline(s): X8C

Introduction: The purpose of our trip was to examine DNA crystals whose arrangement in space had been designed intentionally. We screened the crystals for their abilities to diffract X-rays.

Methods and Materials: DNA motifs were selected for their apparent abilities to create space-filing intermolecular arrangements (1,2). The three motifs used were DNA double crossovers (3), DNA triple crossovers (4) and DNA parallelograms (5). Crystals were grown using the hanging drop method at various salt and precipitant concentrations. Some crystals were brought to NSLS already frozen, while others were flash frozen in liquid nitrogen momentarily before x-ray exposure.

Results: Diffraction patterns were not observed for the majority of the crystals. A crystal assembled from the triple crossover motif diffracted to 8Å. However, we were unable to collect enough frames before the crystal deteriorated, and thus were unable to determine the space group. Another crystal, constructed of the parallelogram motif, diffracted to about 10Å. It did not yield the desired space group, indicating there are flaws in our design and/or method of growing crystals.

Conclusions: Our crystals are of poor quality and did not yield a reasonable resolution. Alternative methods of designing and growing crystals are currently being investigated.

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